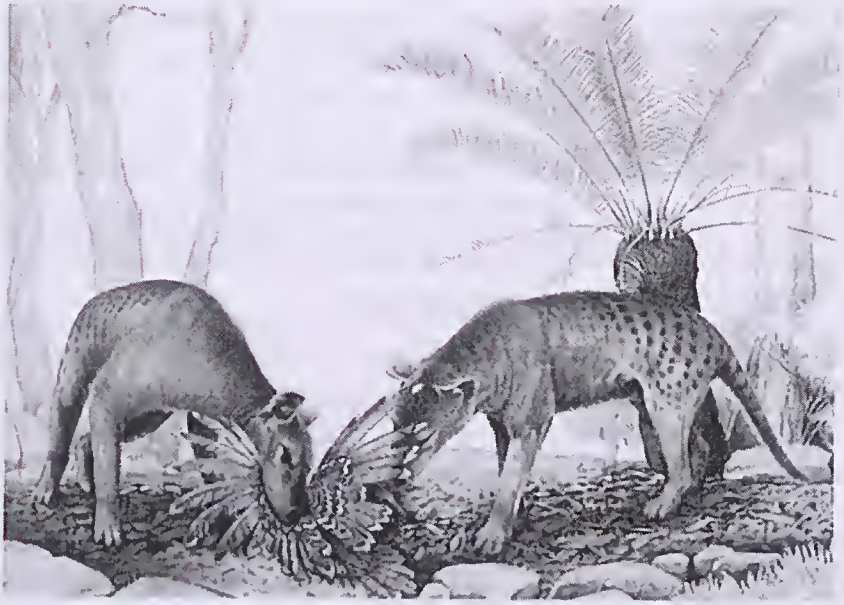
THE FOSSIL COLLECTOR

BULLETIN No. 76 SEPTEMBER 2005



Artistic impression of two Thylacine's dining on a bird. From Kadimakara: Extinct Vertebrates of Australia.

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EDITORIAL NOTES

Well, here we are, spring already. I don't know if it is my imagination or not but it seems Queensland has fewer cold winter days every year, must be climate change, natural or otherwise.

Thank you to Danielle Shean, Mark Saul, Ken Bell and Frank Holmes for contributions to this issue of *The Fossil Collector*. Danielle's article on the Pleistocene of Victoria seems to have raised a little friendly competition as some Queensland palaeontologists have mentioned that there are just as good if not better Pleistocene deposits in Queensland. Of course I wouldn't be a good editor if I didn't tell them to put their money where their mouth's are so hopefully an article on the Pleistocene of Queensland will appear in an upcoming issue of *The Fossil Collector*. Dare I put the challenge out to palaeontologists, both professional and amateur, from the other States and Territories that have a Pleistocene fossil assemblage?

I have certainly enjoyed my return to field trips and collecting this year. Between May and October I will clock up just over six weeks doing what I enjoy with people who have a like interest. My trip to Winton in June will be covered later in this issue so I won't say much here. The first half of September will see me back out at Winton for the second dinosaur dig (yes I had that much fun the first time), then the first half of October will see a fellow collecting brother and I visit Victoria to take in some of that State's palaeontological wonders and give me the chance to meet some people I have wanted to meet for a long time now. I have also been fortunate to be part of a new fossil site the above mention collecting brother has discovered and this shows great promise of many new discoveries, both flora and fauna. My job also enables me to visit fossil localities as well and when I get the chance I certainly don't pass them up. All in all a very exciting and enjoyable return to active palaeontology after what seemed such a long layoff.

Next years collecting season calendar is already starting to fill with another two week trip to Winton planned, several weekend trips and the possibility of a couple of week long trips to some Mesozoic localities in Queensland. I must point out after all this that my right leg does not have the mobility or flexibility it once did but when the opportunity to visit a wonderful palaeontological site comes up, I will find a way.

I find it amusing to hear of and see papers on whether *T. rex* was a hunter of scavenger and wonder why people would devote so much time to such a logical topic. We only have to draw comparisons with present day predators to find the answer to this seemingly problematic question. If we look at extant predatory mammals, fish, lizards and birds (dinosaur relatives) we see that if they have to hunt then they will but if a meal presents itself where the predator doesn't have to expend any energy then they will take advantage of it. To me this is a sign of a hunter/scavenger role in extant predatory animals and surely one that can be applied to every predatory animal since life first appeared on the Earth. Even from the Mesozoic we see examples of *Allosaurus* skeletons around that of a *Stegosaurus* etc that has been stuck in a bog. The Allosaurs certainly weren't hunting an animal that is stuck and can't defend itself, but to find an easy meal - surely a scavenging behaviour. It is also interesting to note that *Allosaurus* is often portrayed as an active ambush hunter but do we have any evidence of this? Surely the same can be applied to *T. rex*, if it had to hunt then it could but if it found a meal that was already dead then why not take advantage of it. Now if I dare draw a comparison to us humans, how many of us actually go out and actively hunt our meals (I don't call going to the shop and buying food hunting)? I'm pretty sure that if all we had to obtain food was teeth, arms, hands and legs most of us would starve. Now does that make us humans scavengers or hunters? Perhaps we should stop worrying whether an animal with a formidable set of teeth and jaws and an extremely powerful body was a hunter or a scavenger, maybe *T. rex* was both!!

THE PLEISTOCENE MEGAFAUNA OF VICTORIA

The following is a summary of a talk given to the Geology Group of the Field Naturalists Club of Victoria by Danielle Shean, Monash University, on May 25th, 2005. The FCAA wish to thank Danielle and the F.N.C.V. for permission to reprint this summary.

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Illustrations reproduced from *Kadimakara: Extinct Vertebrates of Australia* with permission of the artist, F. Knight, and thanks to Dr. P. Vickers-Rich.

The most well-known mega fauna in Australia originate in the Pleistocene, a period of giganticism that spanned over 1 million years. The history of discovery of fossils at Buchan began in the late 1800s when the caves were first explored, since then a large amount of fossil and Recent material has been accumulated, but not studied in close detail. The faunal record at Buchan for the Pleistocene is spotty; much analysis has been carried out on some of the younger faunas within the region, but the larger faunas found within the caves has gone unremarked. The Buchan caves of Victoria display an unusual and diverse faunal assemblage including faunas such as *Palorchestes azael, Thylacoleo carnifex, Phasconlonus gigas, Protemnodon anak, Procoptodon gilli* and *Sthenurus orientalis*. New research in this area, including U-Th dating, analysis of flowstone encasing fossils, newly uncovered material and re-evaluation of existing material has generated a better understanding of both the age and faunal diversity within this region. New faunas have been tentatively identified in the assemblage, based upon differing morphologies in post-cranial material.

Fauna

The Pleistocene period in the Quaternary, spanned from 1.8 million years to 10,000 years ago (Long *et. al.*, 2002). It was the final stage of animal giganticism worldwide, and saw the demise

of the most diverse marsupial fauna ever known. The Pleistocene bridged at least four glacial maxims. This is reflected in the cool and arid conditions that existed at the time; very much like our modern environment. However, it differed from today's environments as it played host to a greater diversity of rainforests and closed sclerophyll forests, as well as open scrublands or sedge lands, and open sclerophyll forests (Galloway & Kemp, 1984).

The assemblage of large marsupials during the Pleistocene consisted of a number of forms including the Vombatiformes – wombat shaped animas that included the hippopotamus sized *Diprotodon optatum*; *Zygomaturus trilobus*, a leathery semi-aquatic marsupial; *Palorchestes azael* and *Palorchestes parvus*, marsupial tapirs; *Phascolonus gigas*, the largest wombat that ever lived; *Ramsayia magna* and *Phascolomys medius*, two large wombats; and *Phascolarctos stirtoni*, the largest koala. There were also large Monotremes – egg-laying mammals, such as *Zaglossus* and *Megalibgwilia ramsayi,* Australia's largest echidnas (Long *et. al.*, 2002).

Among the wide range of kangaroo-shaped forms (Macropodoidea) were: *Procoptodon goliah*, the largest kangaroo to every live; *Sthenurus spp.*, a variant large kangaroo, *Macropus spp.* with larger and smaller mass than seen today; and *Protemnodon spp.*, the giant wallaby.

Predators also took varying sizes and forms during the Pleistocene and included *Thylacine spp.*, the Tasmanian Tiger; *Sarcophilus sp.*, the Tasmanian Devil; and two very unusual forms: *Thylacoleo carnifex* the marsupial leopard and *Propleopus oscillans*, the carnivorous kangaroo. All but the latter belonging to the Dasyuroidea.

Among the non-marsupial mega fauna were *Megalania prisca*, a relative to the Komodo Dragon; *Genyornis*, a giant dromonithid – an emu-appearing bird; and *Wonambi naracoortensis*, the 'Rainbow Serpent', a 5m long python (Smith, 1985).

Distribution of Fossils

There are many deposits of Pleistocene material throughout Australia, the richest being the Naracoorte Caves in South Australia, and the Darling Downs and Riversleigh, both in Queensland. Deposits of fossils in Victoria seem restricted to coastal areas and coast margins. Whilst these sites do not approach the diversity and richness of sites in other States, they do sometimes present very unique and surprising fossil forms. Buchan in East Gippsland is one such site. Current research is focussing primarily upon two reserves, the Buchan Caves and the Pot Holes.

The Buchan Caves Reserve is situated over a series of partially interconnected, younger horizontal caves, cut primarily through the Buchan Caves Limestone, which parallel the N-S direction of the Emu Egg Fault and the palaeo channels of the Murrindal and Buchan Rivers. The Pot Holes Reserve consists of older vertical caves, with N-S trends, cut through the Murrindal Limestone (Finlayson *et. al.*, 1990). When we speak of younger and older, we refer to proceeding generations of caves, to distinguish them from one another.

The Buchan Cave Deposits

Buchan is a fascinating area to study not only because of the karst systems and cave formation, but also the fossils that are being uncovered. Caves provide an ideal environment for the preservation of fossils due to fast sediment accumulation, relatively low erosion rates, stable temperatures, and in many cases because they operate as a closed system. They also provide an extraordinarily good snapshot of faunal assemblages through time.

Buchan is also exhibiting uncommon faunal elements within the assemblage including unusual *Protemnodon* and Hypsiprimnodontid forms, giant wombats, and *Palorchestes azael.*

What is so unusual and very exciting about this fauna is that many of these forms, *P. azael* excluded, have not previously been seen in southeastern Victoria. *Palorchestes azael* is not an unusual species to find in Pleistocene fossil deposits, however it is rare. Its appearance in the fossil record is well documented since its discovery and subsequent description by Sir Richard Owen (1873), however only postcranial elements and teeth have been found, diagnostic skull material has proven elusive, until a well-preserved cranium was discovered at Buchan.

Figure 1. Skull of *Palorchestes azael* (left); reconstruction of *P. azael* (right).

The skull is unique from any other diprotodontid species in that it has a small segregated brain case, an unusually tall, square and flat skull profile, large well developed parietal and squamosals, no central parietal/frontal suture, a small nasal spine, no obvious muscle attachments at the top of the skull and a massive and bolstered zygoma. This suggests that *Palorchestes azael* was a strikingly unusual animal with a small trunk and large square head, which was probably used for pulling up vegetation such as roots (Long et. al., 2002) and ground covering vegetation.

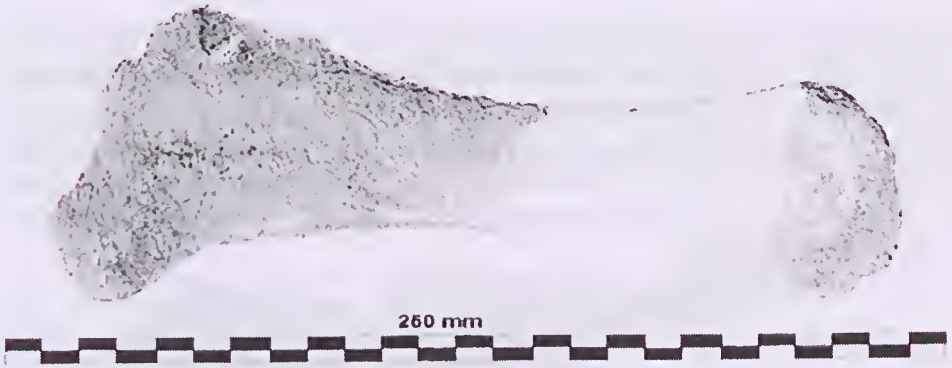

Figure 2. Femur belonging to *Ramsayia magna*.

Some problems that are associated with cave palaeontology involve sediment reworking, which causes disarticulation (break-up of skeleton) and damage, and floor-ceiling inversion (older material at ceiling level, where the floor used to be and younger material at floor level) which causes fossil material to fall to the floor and mix with younger material. The fact that the Buchan caves still operate as an open system with high water flow causes perturbation of fossil material with younger faunas free to enter into the system at any time.

Dating of fossils at Buchan

Since the 1970s the assumed age for the Buchan fauna has been around 23,000 years, based on ^{14}C dating of *Sthenurus* bone

material from Cloggs Cave. New dating techniques such as U-series Mass Spectrometry or ICPMS, applied to flow stone surrounding the *Palorchestes azael* skull have revealed a much greater age. This new dating of the fauna pushes the assemblage much further back in time to around 275,000 years a figure that closely correlates with ages obtained for other cave faunas across Australia, included Naracoorte, Wee Jasper and the Wellington Caves.

Extinction Theories

The controversy surrounding the demise of the mega fauna in Australia is well known. While we accept the fact that between 40,000 and 46,000 years ago, 20% of the existing land based marsupial faunas became extinct (Wroe et. al. 2004), we still do

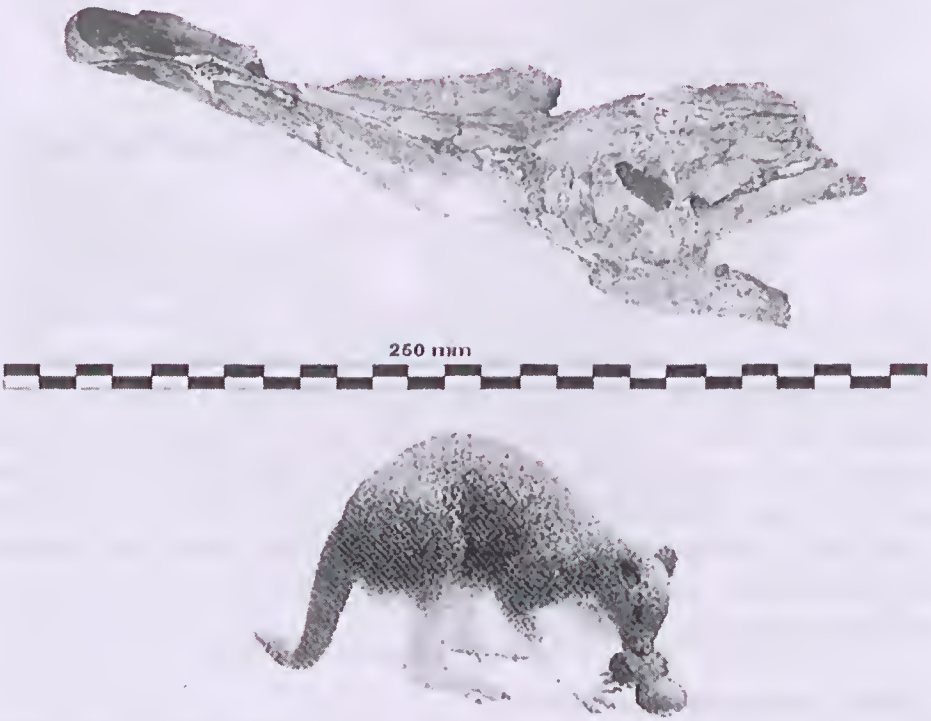

Figure 3. A partial pelvis belonging to *Hypsiprymnodon*-like species and artist's reconstruction of *Propleopus oscillans*.

not know why it happened.

There are three current extinction theories: these are the Blitzkrieg, or lightning strike theory; the Threshold theory; and competition driven extinction theory. The Blitzkrieg theory supposes that man came to Australia and within 1000-2000 years completely obliterated the mega fauna (Brook & Bowman, 2004, Wroe *et. al.* 2004). This theory may be argued by the presence of the Cuddie Springs deposit, which suggests that man, and mega fauna coexisted.

The Threshold theory surmises that a progressive decrease in habitable environmental condition led to the extinction of the mega fauna. Two problems exist to dispute this theory: firstly, environmental conditions 40,000 years ago were not as severe as they had been previously; and secondly, stress conditions were not as dramatically evidenced at 40,000 years as they were prior

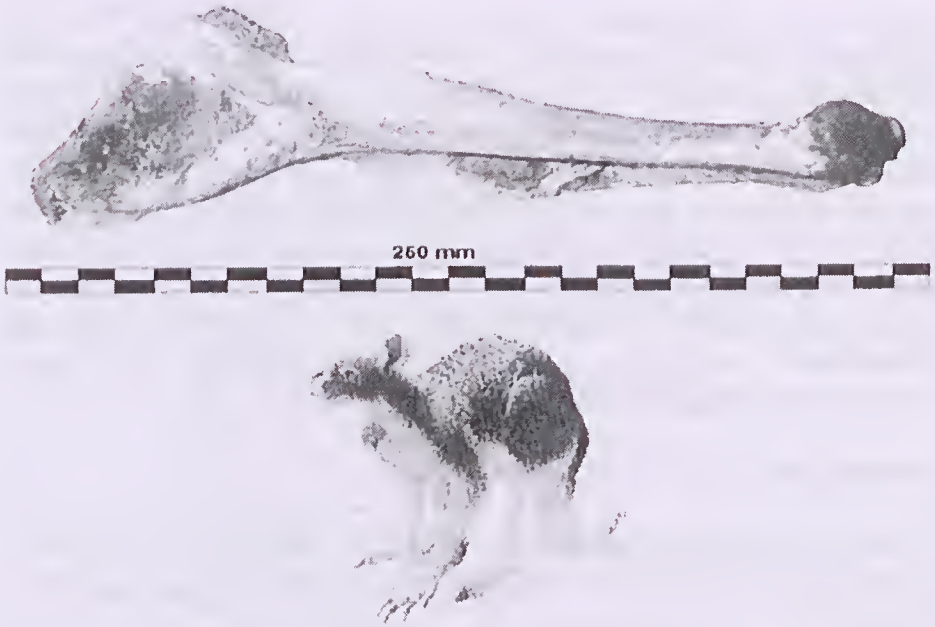

Figure 4. A partial pelvis belonging to *Protemnodon sp.* and artist's reconstruction of *Sthenurus sp.*, a species of physical similarity.

to this time, when no extinctions occurred (Galloway & Kemp, 1984). Support for this comes from cyclic changes in environmental conditions seen in oxygen isotope stages reflected in other continents, especially Africa and North America, as well as Australia.

Competition driven extinction supposes that humans are competitors in the environment rather than predators. This theory suggests that competition for resources drove the mega fauna to extinction. Problems with this theory are that there is no evidence to support controlled burning by Aboriginals, nor strong evidence, other than Cuddie Springs, to support cohabitation. Neither is there evidence of human predation of mega fauna to support this theory and the largest decline in smaller native fauna occurred Post-European settlement, not before.

Conclusions

During the Pleistocene Australia played host to a diverse marsupial fauna including the world's largest marsupial *Diprotodon optatum*. Exotic forms such as *Propleopus sp.*, *Palorchestes sp.*, *Zygomaturus sp.* and *Thylacoleo sp.* dominated the landscape. All these animals became extinct at around 46,000 to 40,000 years ago. What event or events that powered the extinction of these faunas remains an enigmatic and contentious issue with many theories, each plagued by problems caused by holes in the fossil record. In order to understand both our past and our present we need Palaeontology in all its many aspects.

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Faunas from cave deposits at Buchan

Pseudomys oralis – Hastings River mouse
Cercartetus nanus – eastern pygmy possum
Sminthopsis leucopus – white footed dunnart
Dasyurus viverrinus – river quoll
Perameles nasuta – long nosed bandicoot
Nyctophilus timoriensis – thick thumbed bat
Chalinolobus morio – lobe lipped bat
Pipistrellus tasmaniensis – thick thumbed bat
Eptesicus pumiles – bat
Nyctophilus geoffryi – long eared bat
Antechinimo stuartii – marsupial mouse
Rattus fuscipes – bush rat
Miniopterus schreibersii – Schreiber's bat
Pseudomys fumeus – smokey mouse
Hydromys chrysogaster – water rate

Thylacoleo carnifex owen – marsupial lion
Phascolarctus cinerea - koala
Palorchestes – maruspial tapir
Phascogale - brush-tailed marsupial mouse
Isoodon – short nosed bandicoot
Trichosurus - brush-tailed possum
Thylacinus – Tasmanian tiger
Petrogale penicillata - Brush-tailed rock wallaby
Sarcophilus laniarius – Tasmanian Devil
Pseudomys novaehollandiae - New Holland mouse
Procoptodon gilli – Short- faced giant wallaby
Acrobatus – sugar glider
Protemnodon – giant wallaby
Macropus major – eastern grey kangaroo
Tachyglossus – echidna
Phascolonus gigas – giant wombat
Mastocamys fuscus- broad toothed rat
Burramys parvus – mountain pygmy possum
Notomys mitchellii – Mitchell's hopping mouse
Vombatus ursinus – common wombat
Bettongia gaimardi - Gaimard's rat kangaroo
Pseudocheirus – possum
Muridae – rat family
Sthenurus – giant kangaroo
Aquila audax – Wedge tailed eagle
Dasyornis broadbenti - Rufous bristlebird
Gallinula mortierii - Tasmanian native hen
Cacatua tenuirostris - Long-billed Corella
Anas superciliosus - Dusky wood swallow

BACK ISSUES

Back issues of ***The Fossil Collector***, Bulletins No. 42 to 75 (January 1994 to May 2005), are still available.

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BOOKS AND BOOK REVIEWS

The Fossils of the Florissant. By Herbert W. Meyer, 2003. Smithsonian Books. Hardcover 258pp, ISBN 1588341070. Price approx. US$30 from most online bookstores or available by ordering through Australian bookstores but price dependent on exchange rate.

There are numerous publications covering the many topics relating to Palaeontology. Occasionally, a book is published that has a tendency to "standout" among the many others within that category. The book "The Fossils of the Florissant" is one such book.

This particular book offers a superb coverage of the Eocene Florissant fossil beds, from events that led to their formation, the early and current palaeontological history, as well as descriptions and photographs of the diverse flora and fauna. The deposit forms the Florissant Fossil Beds National Monument, which is located west of Pikes Peak, Colorado, USA. The primary fossils found are insects and plants.

Topics covered in this book are:
The history of research and conservation.
Geologic settings and processes of fossilisation
Reconstructing the ancient ecosystem.
The fossil plants, the fossil spiders, insects, other invertebrates and fossil vertebrates.

The narrative is broken by exquisite photographs of the site, historical scenes and the numerous specimens. The book also has an appendix containing a complete listing of the fossil organisms from Florissant and museums holding significant Florissant collections. It also contains a general reference, bibliography and index.

This book is an absolute must for anyone interested in palaeontology or natural history.

Reviewed by Mark Saul

Life on a Young Planet: The First Three Billion Years of Evolution on Earth. By A. H. Knoll, 2003. Princeton University Press. Hardcover, 277pp, price approx. AU$40 through some Australian bookstores but becoming more difficult to obtain. Softcover, 304pp, ISBN 0691120293, price approx US$13 from most online bookstores.

Most books dealing with fossils and evolutionary themes seldom devote more than a passing mention of probable happenings in the long time before the Cambrian explosion. Extensive studies of the past decade or so have shown that there were extensive environmental changes in the Archaen and Proterozoic Eons and that there is plentiful evidence for life, albeit mainly molecular, and for evolutionary processes occurring during these periods.

In this book, Professor Knoll tells of his and others' studies of rocks in the field and then in the lab, showing clearly how and why we can come to the evidence for this early evolution. He describes localities in Siberia, Namibia, Australia, China and Canada, discusses their varied faunas of stromatolites, bacterial and algal fossils, ornamented eukaryotic microfossils and other forms, many of these are illustrated by colour plates. He outlines the chemical changes found in these early deposits and explains how they can help to understand the environments present, such as the iron rich seas and the development of oxygen in the atmosphere and what constraints these could have had on early life. There are also discussions on the tree of life, the ages of the branching of the Kingdoms, cellular process and of the Ediacaran fossils and their interpretation. Finally, Prof. Knoll examines what implication these processes on Earth may have on our understanding of life on Mars and further a field. Each of the 13 chapters has an extensive, annotated reading list.

I found this book very interesting and informative. I would certainly recommend it to anyone interested in the early life and processes of the Earth.

Reviewed by Ken Bell.

FOSSIL INVERTEBRATES by Paul D. Taylor & David N. Lewis, 2005. The Natural History Museum, London. Hardcover 208pp, ISBN 0643091629. Price $69.95.
This book is designed to unravel and interpret the rich fossil record of invertebrate fossils. It is ideal for students and amateur enthusiasts and covers all major groups of fossil invertebrates as well as providing illustrated descriptions of selected genera.

DINO-BIRDS: From Dinosaurs to Birds by Angela Milner, 2002. The Natural History Museum, London. Hardcover 64pp, ISBN 0565091743. Price $24.95.
Dino-birds explores the ever-growing evidence supporting the evolution of dinosaurs to birds. The author looks at the astounding fossil 'feathery' dinosaurs from China and the bird fossils from other sites around the world, to take us on a journey from those dinosaurs to the birds we see today.

EVOLUTION OF FOSSIL ECOSYSTEMS by Paul Seldon & John Nudds, 2004. Manson Publishing, UK.
Hardcover $144.00 ISBN 1840760400
Softcover $72.00 ISBN 1840760419
Refer *The Fossil Collector*, Bulletin 74, p. 17, for book summary.

FOSSILS: The Key to the Past by Richard Fortey, 2002 (second edition). The Natural History Museum, London. Softcover 232pp. ISBN 0565091638. Price $49.95.
Reorganised and updated edition of this popular book first published in 1982. Also in this new edition, the author shows how fossils, far from being 'dry bones', can be used to reconstruct the history of the Earth and our past.

AMMONITES by Neale Monks & Philip Palmer, 2002. The Natural History Museum, London. Softcover 160pp. ISBN 0565091697. Price $49.95.
Refer *The Fossil Collector*, Bulletin 68, p. 10, for book summary.

FOSSIL PLANTS by Paul Kenrick & Paul Davis, 2004. The Natural History Museum, London. Softcover 192pp. ISBN 0643091319. Price $59.95.
Fossil plants is the first book of its kind to provide an overview of the development of plant life through time focusing on the key events and periods. Beginning with the origins of plant life in the sea, the book traces the evolution of land plants, ferns, conifers and their relatives, and flowering plants. It is interwoven with 'snapshots' of landscapes and environments at various periods of geological time.

FROM THE BEGINNING by Katie Edwards & Brian Rosen 2004 (revised edition). The Natural History Museum, London. Softcover 72pp. ISBN 064309069X. Price $29.95.
From the Beginning describes the history of Earth from its very beginnings to the planet we know today. It explores the ceaseless changes of the Earth, describing the development of land, sea, atmosphere, climate and life.

DIGGING UP DEEP TIME BY Paul Willis & Abbie Thomas, 2005. ABC Books, Sydney. Softcover 240pp. ISBN 0733312608. Price $34.95.
Digging Up Deep Time traces Australia's unique and fascinating prehistory through its extraordinary fossil sites. Australia is home to some of the world's earliest fossil finds – and home to some of its most unique.

AMBER: The Natural Time Capsule by A. Ross, 1998. The Natural History Museum, London. Softcover 72pp. ISBN 056509131X. Price $24.95.
Amber is a fascinating substance, one that offers a unique intersection of the fields of palaeontology, botany, entomology and mineralogy. This book provides a thorough overview of this prehistoric subject and its fossilised inclusions.

REVOLUTIONS IN THE EARTH: James Hutton and the True age of the World by Stephen Baxter, 2003. Weidenfeld &

Nicolson, UK. Softcover 256pp. ISBN 0753817616. Price $26.95. This is the little known story of a man who fought hard against orthodox beliefs to prove the antiquity of the earth and of the dedicated loyalty of an enlightened circle of friends. Hutton's geological theory of the Earth would cause a profound religious debate as well as provoking decades of criticism. His revelation, however, was ultimately one of the most extraordinary and essential moments in scientific history.

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DIGGING FOR DINOSAURS NEAR WINTON, CENTRAL QUEENSLAND

Report by Paul Tierney

The last week of June saw my eldest daughter, Ayla, and I head into central Queensland to participate in the two week Australian Age of Dinosaurs Inc. (AAOD) and Queensland Museum (QM) run dinosaur dig experience. The dig is held on a property called Belmont, which is to the north east of Winton, Belmont is an operating sheep property, which runs approximately 12,000 sheep, and is owned and run by Dave and Judy Elliott and their four children. Belmont is also where Elliot the sauropod was discovered and the reason for the continued digs held on the property.

Geology and Palaeontology

The dinosaur bones, and other fossils, are found in the Late Cretaceous Winton Formation, which was deposited between

98-95 million years ago, it is a non marine unit made up of sandstones, mudstones, siltstones and claystones, almost entirely deposited by rivers, lakes and streams which formed part of the great inland river plains which were laid down between 98-93 million years ago. The Formation was deposited as the last and uppermost sedimentary unit of the Great Artesian Basin, is up to 1 km thick and overlies the marine Mackunda Formation. The Formation contains abundant plant fossils, freshwater fish, freshwater bivalves, freshwater gastropods, occasional insects, lungfish toothplates, crocodiles and of course dinosaurs. The plant fossils at the Elliot dig site suggest this part of the Winton Formation was an open forest dominated by conifers and early flowering plants.

The Elliot dig site is located near the base of the Winton Formation and lies at what can be considered the transition between the marine environment of the Mackunda Formation and the non marine Winton Formation, which at its base would have had the deposits of coastal lowlands, swamps and estuaries. The coastal plain would have been wide, with low relief, and the river flowing to the north would have formed a broad delta (or set of delta's) into the retreating sea. Not far from the Elliot dig site is a another site which has both marine and non marine fossils, this has been interpreted as estuarine and shows how close the Elliot dig was to the sea. The bones of the dinosaur remains are thought to be from a flood event where the bones have been washed downstream and deposited along a channel.

The Dinosaur Bones

Elliot was a sauropod which was between 16-23 metres long, 3.5-4 metres high at the hip and weighed approximately 22-28 tonnes (equivalent to five African elephants). Which family of dinosaur Elliot belonged to is still not certain but the most likely candidate is that of the Titanosauridae. Due to the nature of the deposition of the bones no complete skeleton has been found

but to date several bones from Elliot have been recovered, these include an almost complete femur (the bone that started it all), several ribs, elements of the pelvis, a toe bone, tibia and several vertebra.

Bones from another sauropod, named Mary, have also been recovered along with teeth from a theropod, individual teeth from Ankylosaurid and Hypsilophodontid dinosaurs, along with claws from small theropods (possibly raptor type dinosaurs).

The Dig Experience

Being a sheep property, Belmont has a shearing shed and shearers quarters and as the digs are an organised event between the AAOD and QM, paying participants are accommodated in the shearers quarters for the week they are there. All bedding, towels and food are provided, the quarters have the most wonderful hot showers (especially after a day digging in the dirt), and in my opinion the food is spectacular.

The dig itself is not what one would expect as the Winton Formation is overlain by a one metre thick layer of black soil but, fortunately, after the surface of the black soil has been searched for bone material it is removed by heavy equipment thus exposing the underlying rock. The black soil is searched as expansion and contraction of the soil effectively move any bone material from the top of the Winton Formation up through the soil profile to the surface. Most bone that goes through this process is generally fairly fragmentary but it is possible to follow the bone trail back to something more interesting.

After the black soil is removed more heavy equipment is used to scrap away small cuts of rock with people following behind to look for bone material. The rock is a grey colour while the bone is a yellow/orange colour (the bone has an iron oxide coating) which makes for easy identification. If a bone is found then the more traditional methods of trenching, jacketing, undercutting, rolling and jacketing again are carried out. There are also ironstone

nodules present which can be mistaken for bone but these are easily identified by use of a shovel.

While the original plan was to be at the dig for the entire two weeks, Ayla came down with a dose of chicken pox so we returned five days early. We were both bitterly disappointed by this but I have to say the time we spent at Belmont was about a 15 out of 10, absolutely great. We also broke the drought as the days after we arrived Belmont received 50 mm of rain and while we couldn't dig for three days, driving was fun, especially on wet black soil. Following are some pictures which I think portray a wonderful experience. All fossils are from Belmont and where recovered from or near the Elliot dig site and from the Winton Formation.

Figure 1. The author trying his puddle negotiation skills. A little bit of rain goes a long way, especially on black soil. The most surprising thing was that this puddle was gone the following day.

Figure 2. A layer of the Winton Formation is removed while people follow behind looking for evidence of bone material.

Figure 3. A small excavator is also used to dig holes in a more concentrated area, the machine is also great for removing overburden that would otherwise take hours to remove by hand.

SOME OF ELLIOT'S BONES

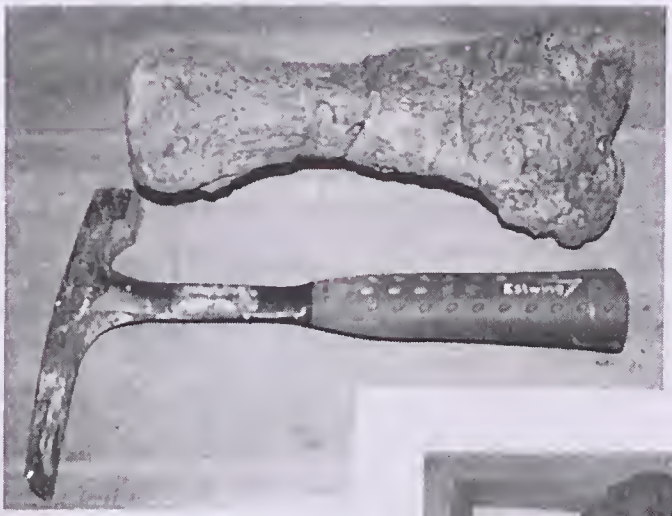

Figure 4 (above). A prepared toe bone.

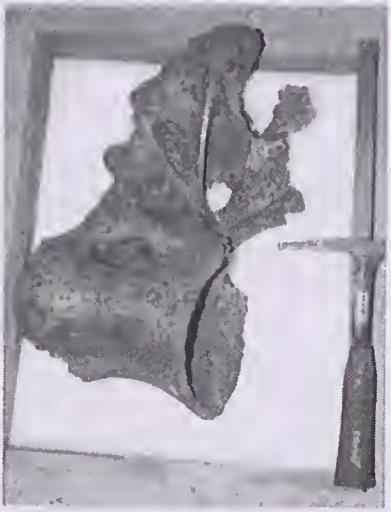

Figure 5 (right). One of several prepared vertebra.

Figure 6 (below). A prepared rib.

Figure 7. Another of Elliot's vertebra.

Figure 8. A Hypsilophodontid tooth from the Elliot dig site.

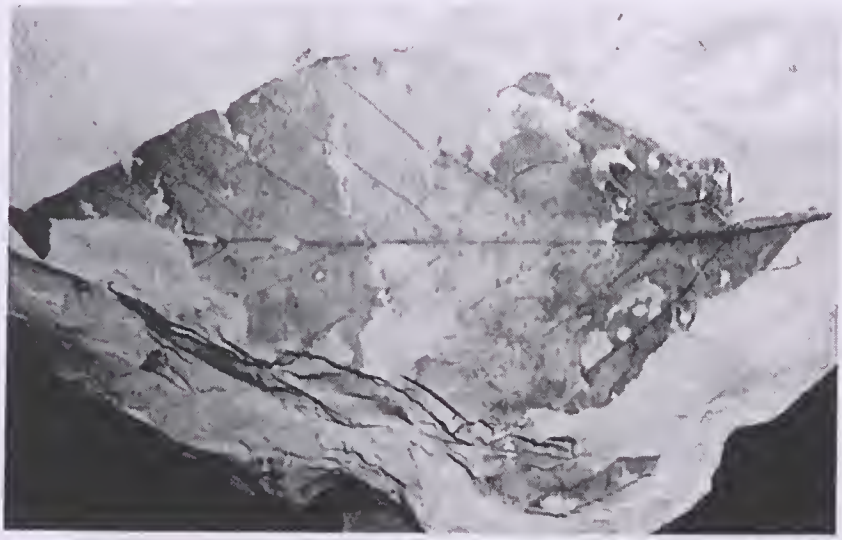

Figure 9. An angiosperm leaf, one of many that can be found in the Winton Formation. Length of specimen 12 cm, from the Queensland Museum collections.

Figure 10. *Araucaria mesozoica*, a Cretaceous conifer that sauropods probably ate. Length of specimen 15 cm, from the Queensland Museum collections.

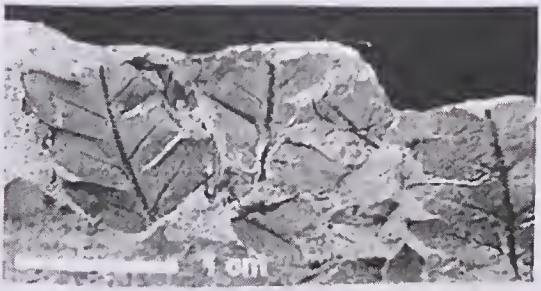

Figure 11. A specimen of *Cladophlebis*.

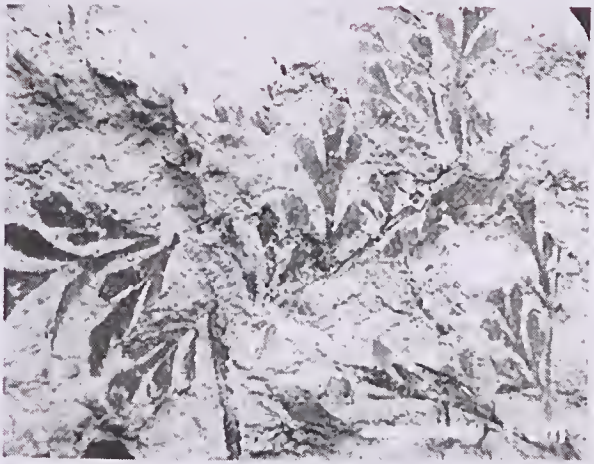

Figure 12. An unnamed fern.

Figure 13. *Ginkgo wintonensis*. Length of specimen about 4 cm.

Figure 14. A hind wing of the Cretaceous drgonfly *Aeschnidopsis flindersiansis*, one of only four from the Cretaceous of Queensland and the first from the Winton Formation. Length of specimen 34 mm.

Figure 15. The author's find of the trip (forget about the dinosaurs bones, I'm an invertebrate type of guy). A new and as yet un-named freshwater bivalve. Length of specimen 12 mm.